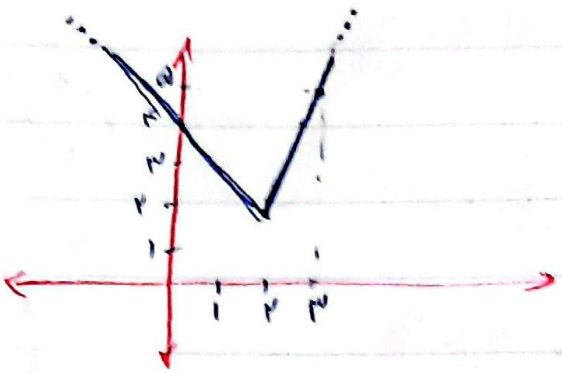
DATE: SUB: (٢٠)

١-

الف) $y = x + |2x - 4|$

$x < 2$	$x \geq 2$
$x + 4 - 2x$	$x + 2x - 4$
$-x + 4$	$3x - 4$

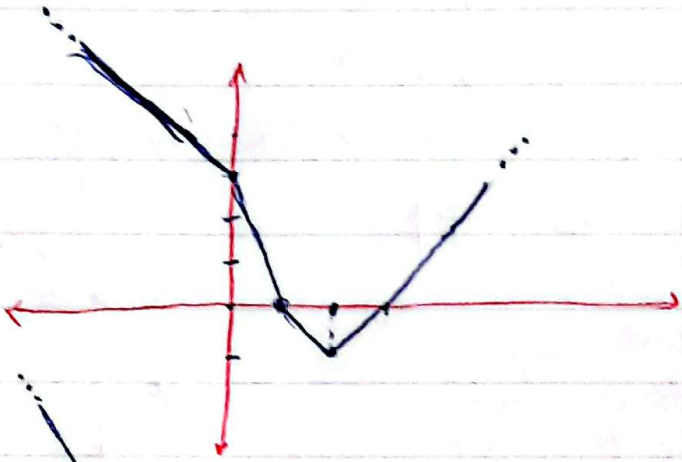


(٣)

$R_f = [2, +\infty)$

ب) $y = |x-2| + |x-1| - |x|$

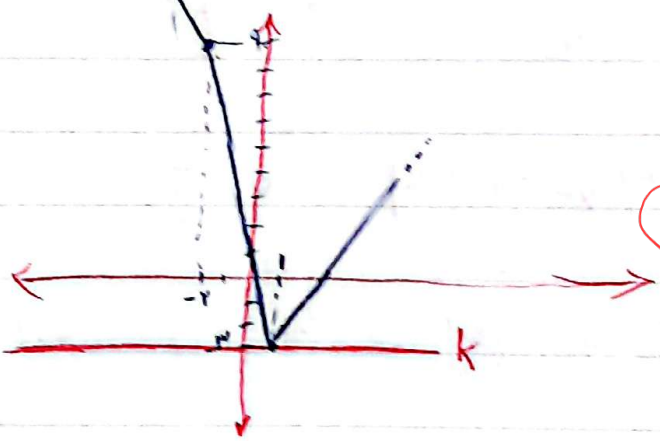
$x < 0$	$0 \leq x < 1$	$1 \leq x < 2$	$x \geq 2$
$2 - x + 1 - x + x$	$2 - x + 1 - x - x$	$2 - x + x - 1 - x$	$x - 2 + x - 1 - x$
$-x + 3$	$-2x + 3$	$-x + 1$	$x - 3$
3	0	-1	



$R_f = [-1, +\infty)$

٢- $|2x - 3| - |x + 2| = k$

$x < -2$	$-2 \leq x < 1$	$x \geq 1$
$3 - 2x + x + 2$	$3 - 2x - x - 2$	$2x - 3 - x - 2$
$-2x + 5$	$-3x + 1$	$x - 5$
9	-2	

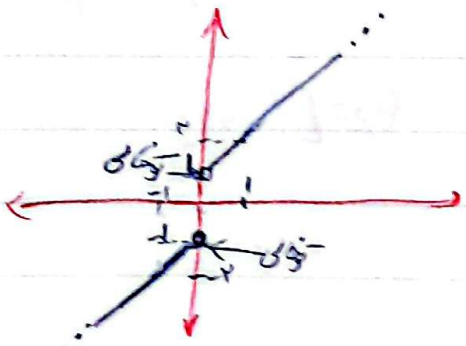


(٣)

$\Rightarrow k = -2$

الف-٣) $y = x + \frac{x}{|x|}$

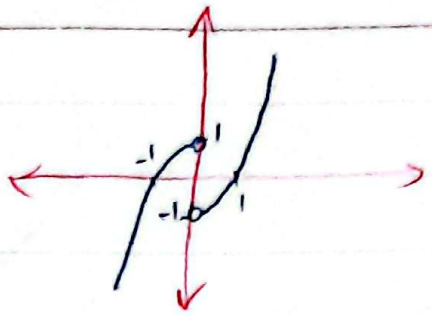
$x < 0$	$x > 0$
$x - 1$	$x + 1$
شق	



(٣)

DATE: SUB:

ب) $y = x|x| - \frac{x}{|x|}$



$-x^2+1$ و x^2-1

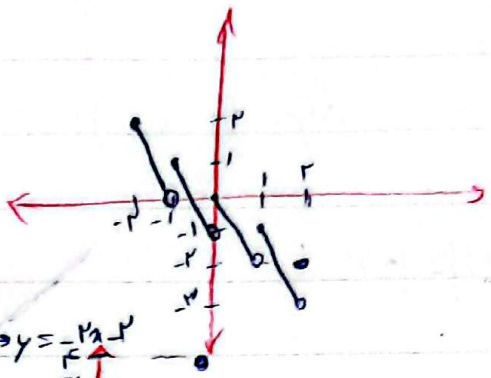
ج- الف) $y = [x] - x^2$

$x=2 \rightarrow y=-2$

$1 \leq x < 2 \rightarrow y = 1-x^2$

$0 \leq x < 1 \rightarrow y = -x^2$

$-1 \leq x < 0 \rightarrow -x-1 \leq y$ $-2 \leq x < -1 \rightarrow y = -x^2-2$



ب) $y = [x]|x|$

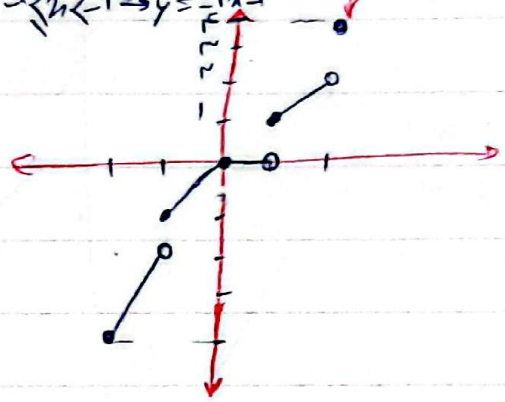
$x=2 \rightarrow y=4$

$1 \leq x < 2 \rightarrow y = x$

$0 \leq x < 1 \rightarrow y = 0$

$-1 \leq x < 0 \rightarrow y = x$

$-2 \leq x < -1 \rightarrow y = x^2$



د- الف) $y = x^3 - [x^3] \rightarrow R_f = [0,1)$

ب) $y = 4x - 4[x] \rightarrow 4(x-[x]) \rightarrow R_f = [0,4)$

ج) $y = x - 5\left[\frac{x}{5}\right] \rightarrow 5\left(\frac{x}{5} - \left[\frac{x}{5}\right]\right) \rightarrow R_f = [0,5)$

د) $y = [x] - x^2 \rightarrow R_f = (-1,0]$

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۶- الف) $y = 3\sin x + 4\cos x \rightarrow R_f = [-\sqrt{9+16}, \sqrt{9+16}] \rightarrow R_f = [-5, 5]$

ب) $y = 5\sin x - 3\cos x \rightarrow R_f = [-8, 8]$

ج) $y = [\underbrace{3\sin x + 4\cos x}_{[-5,5]}] \rightarrow R_f = \{-9, \pm 8, \pm 7, \pm 6, \pm 5, \pm 4, \pm 3, \pm 2, \pm 1, 0\}$

د) $y = \sqrt{\underbrace{\cos x - 2\sin x}_{[-\sqrt{5}, \sqrt{5}]}} \rightarrow R_f = [0, \sqrt{5}]$

۷- الف) $y = \sin^2 x + 3\sin x + 2 + \frac{1}{4} - \frac{1}{4} = \underbrace{\left(\sin x + \frac{3}{2}\right)^2}_{[\frac{1}{2}, \frac{5}{2}]} - \frac{1}{4} \rightarrow [0, \frac{25}{4}]$

$\sin x \in [-1, 1]$

$\rightarrow R_f = [0, 6]$

ب) $y = 2\sin^2 x + 3\sin x + 2$

$\sin x = -1 \rightarrow 2 - 3 + 2 = 1$

$\sin x = 1 \rightarrow 2 + 3 + 2 = 7$

$-\frac{3}{4} \leq \sin x \rightarrow \frac{9}{8} - \frac{9}{4} + 2 \leq \frac{7}{8}$ ($-\frac{9}{8}$)

$\Rightarrow R_f = [\frac{1}{8}, 7]$

۸- الف) $y = \frac{\sin^2 x}{1 - \cos^2 x} + 4\cos^2 x = 1 + 4\underbrace{\cos^2 x}_{[0,1]} \rightarrow R_f = [1, 5]$

ب) $y = \frac{2\cot x}{\underbrace{1 + \cot^2 x}_{\frac{1}{\sin^2 x}}} = 2\frac{\cos x}{\sin x} \times \sin^2 x = 2\cos x \sin x = \sin 2x$

$\rightarrow R_f = [-1, 1]$

DATE: SUB:

9- الف) $y=\sin^9 x+\cos^9 x \longrightarrow R_f=[2^{1-2^9},1] \longrightarrow R_f=[\frac{1}{2^9},1]$

ب) $y=[\underbrace{\sin^8 x+\cos^8 x}_{[2^{1-2^3},1]}] \longrightarrow R_f=\{0,1\}$ (۲)

10- الف) $y=\frac{12x^2+7x-5}{x+5}=\frac{(x+5)(12x-1)}{x+5} \longrightarrow R_f=IR-\{-9\}$

$12\times(-5)-1=-61$ (۲)

ب) $y=\frac{x^3-1}{x-1}=\frac{(x^2+x+1)(x-1)}{(x-1)} \longrightarrow R_f=[\frac{3}{4},+\infty)$

$x^2+x+1 \longrightarrow -\frac{1}{2} \longrightarrow \frac{1}{4}-\frac{1}{2}+1=\frac{3}{4}$ min

$x^2+x+1 \xrightarrow{x=1} 1+1+1=3$ طرف دیگر نمودار ۳ داریم